3.1.1 Description of Vertebrate Species Summaries

Sections 3.1.2 through 3.1.5 provide individual species summaries for each vertebrate Species of Greatest Conservation Need. The species summaries contain information describing the criteria used to evaluate the species; association with each Ecological Landscape in the state; ecological priorities for the species; and species-specific threats, issues, and priority conservation actions. Sections 3.1.1.1 through 3.1.1.4 further describe the information that can be found in each summary and should be used as a "key" to the individual summaries.

3.1.1.1 Vertebrate Species Evaluation Criteria Definitions

Each native vertebrate species of wildlife in Wisconsin was evaluated based upon seven criteria (i.e., State Rarity, State Threats, State Population Trend, Global Relative Abundance, Global Distribution, Global Threats, and Global Population Trend). Each criterion provided a measure of a species' vulnerability and was scored on a scale of 1 through 5. The mean of the scores, referred to in this document as "Mean Risk Score," was used to identify the vertebrate Species of Greatest Conservation Need. For the most part, species above the Mean Risk Score cut-off were considered Species of Greatest Conservation Need and those below were not (Section 2.3.1). For each vertebrate Species of Greatest Conservation Need, additional information was gathered regarding the importance of Wisconsin to the species and its conservation; that information is summarized through an Area of Importance score.

Definitions for each of the seven criteria, Mean Risk Score, and Area of Importance are provided below.

State Rarity

State Rarity is a measure of the relative abundance of breeding individuals of a species within the state relative to the abundance of breeding individuals of other species. This process assumes that species that are rare or uncommon in the state are more vulnerable to decline or extinction from the state than species that are more common. State Rarity was quantified using a parameter developed from State Ranks, which are a measure of species' rarity based on their number of occurrences in Wisconsin (Wisconsin Natural Heritage Program 2004b).

State Rarity Score	Definition
1	Demonstrably secure in Wisconsin
2	Apparently secure in Wisconsin, with many occurrences
3	Rare or uncommon in Wisconsin (21-100 occurrences)
4	Imperiled in Wisconsin because of extreme rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making the species very vulnerable to extirpation from the state
5	Critically imperiled in Wisconsin because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factors(s) making the species especially vulnerable to extirpation from the state

State Threats

This factor reflects the effects of current and future extrinsic conditions on the ability of a species to maintain healthy populations through successful reproduction in the state. Threats to suitable breeding conditions are defined as any extrinsic factor that reduces the likelihood of the persistence of a population and can include predation, poaching, parasitism, poisoning from pesticides or other environmental contaminants, habitat fragmentation, deterioration, or loss, hybridization, collisions with power lines or other hazards, and other extrinsic factors that reduce the suitability of breeding conditions.

State Threats Score	Definition
1	Future conditions for breeding populations are expected to be enhanced by human activities or land-uses; potentially a "problem" species
2	Future conditions for breeding populations are expected to remain stable; no known threats
3	Slight to moderate decline in the future suitability of breeding conditions is expected
4	Severe deterioration in the future suitability of breeding conditions is expected
5	Extreme deterioration in the future suitability of breeding conditions is expected; species is in danger of regional extirpation or major range contraction, or has a low probability of successful reintroduction where already extirpated

State Population Trend

State Population Trend is an indicator of vulnerability and represents the direction and magnitude of changes in the state population size over the past 30 years. This process assumes that state population decreases are an indication of species' vulnerability in Wisconsin.

State Population Trend Score	Definition
1	Large population increase over the past 30 years
2	Possible or moderate population increase, or population stable over the past 30 years
3	Uncertain population trend over the past 30 years
4	Possible or moderate population decrease over the past 30 years
5	Large population decrease over the past 30 years

Global Relative Abundance

This is a measure of the global relative abundance of breeding individuals of a species within its range relative to other species. Interpretation of this score is based on the assumption that species that are rare or uncommon are more vulnerable to decline or extinction than species that are more common.

Global Relative Abundance Score	Definition
1	Occurs in highest relative abundance
2	Occurs in high relative abundance
3	Occurs in moderate relative abundance
4	Occurs in low relative abundance
5	Occurs in lowest relative abundance

Global Distribution

This factor represents global distribution of breeding individuals of a species during the breeding season. Interpretation of this score is based on the assumption that species with a narrowly distributed breeding population are more vulnerable than species with a widely distributed breeding population.

Global Distribution Score	Definition
1	Distribution area occupied is most of the continent
2	Distribution area occupied is ¾ of continent
3	Distribution area occupied is half the continent
4	Distribution area occupied is ¼ of the continent
5	Distribution area occupied is very restricted, covering only a small part of the continent

Global Threats

This factor reflects the effects of current and future extrinsic conditions on the ability of a species to maintain healthy populations through successful reproduction. Threats to suitable breeding conditions are defined as any extrinsic factor that reduces the likelihood of the persistence of a population, and can include predation, poaching, parasitism, poisoning from pesticides or other environmental contaminants, habitat fragmentation, deterioration, or loss, hybridization, collisions with power lines or other hazards, and other extrinsic factors that reduce the suitability of breeding conditions.

Global Threats Score	Definition
1	Future conditions for breeding populations are expected to be enhanced by human activities or land-uses; potentially a " problem" species
2	Future conditions for breeding populations are expected to remain stable; no known threats
3	Slight to moderate decline in the future suitability of breeding conditions is expected
4	Severe deterioration in the future suitability of breeding conditions is expected
5	Extreme deterioration in the future suitability of breeding conditions is expected; species is in danger of regional extirpation or major range contraction, or has a low probability of successful reintroduction where already extirpated

Global Population Trend

This factor reflects the direction and magnitude of changes in the global population size over the past 30 years. This process assumes that global population decreases are an indication of species' vulnerability.

Global Population Trend Score	Definition
1	Large population increase over the past 30 years
2	Possible or moderate population increase, or population stable over the past 30 years
3	Uncertain population trend over the past 30 years
4	Possible or moderate population decrease over the past 30 years
5	Large population decrease over the past 30 years

Mean Risk Score

Each species was assigned a numerical score for each criterion (i.e., State Rarity, State Threats, State Population Trend, Global Relative Abundance, Global Distribution, Global Threats, and Global Population Trend). Scores were then summed to produce a total risk score for each species. The total risk score was divided by the number of criteria scored (note that for some species not all criteria were able to be scored due a lack of available information) to produce a Mean Risk Score.

Area of Importance

For species identified as vertebrate Species of Greatest Conservation Need, Area of Importance was used to provide additional information regarding population distribution. Area of Importance reflects the relative importance of the state to a species and its conservation, based on the abundance of the species in the state relative to other areas.

Area of Importance Score	Definition
1	Does not occur in manageable numbers; could include species of accidental or sporadic occurrence
2	Present in low relative abundance, but occurs in manageable numbers in at least part of the state
3	Present in moderate relative abundance, relative to other parts of a species' range
4	Present in high relative abundance, relative to other parts of a species' range
5	Present in highest relative abundance within a species' range

3.1.1.2 Ecological Landscape Association Scores

Each vertebrate species summary includes a map that shows the probability that a species occurs in each of the sixteen Ecological Landscapes present in the state. Ecological Landscapes were chosen to represent species locations in the state because they allow the most effective application of the information in the *Strategy.* Coarse-level information on locations and distributions are known for all vertebrate Species of Greatest Conservation Need. However, there is considerable variation among species in the degree to which ranges and occurrence locations are known. For some, existing occurrence information, mostly contained in the Natural Heritage Inventory Database (BIOTICS), the Wisconsin Breeding Bird Atlas (Wisconsin Society for Ornithology 2005), or the Geographic distributions of the amphibians and reptiles of Wisconsin (Casper 1996), is relatively comprehensive and range maps could be drawn with considerable certainty. However, for most of the vertebrate Species of Greatest Conservation Need, recent inventory is lacking and, more importantly, the availability of critical habitat plays a major role in where species are likely to occur. Because the distribution of habitats is the primary factor separating and distinguishing one Ecological Landscape from another, and since the Ecological Landscapes split the state into 16 relatively small sections, we believe it makes more sense to evaluate species distributions based on broader ecological themes. As such, the description of the locations of the Species of Greatest Conservation Need, though based on published species ranges and known occurrences, is best represented by Ecological Landscape. Please see Section 2.2.1 for additional information regarding Ecological Landscapes.

The definitions for Ecological Landscape scores are shown below, along with the corresponding colors used on the maps shown in the species summaries.

Probability of Occurrence	Score & Map Color	Description
High	3	Species is (and/or historically was) significantly associated with the Ecological Landscape, restoration of this Ecological Landscape would significantly improve conditions for the species.
Moderate	2	Species is (and/or historically was) moderately associated with the Ecological Landscape, restoration of this Ecological Landscape would moderately improve conditions for the species.
Low	1	Species is (and/or historically was) only minimally associated with the Ecological Landscape, restoration of this Ecological Landscape would only minimally improve conditions for the species.
None	0	Species does not (and did not historically) use this Ecological Landscape.

3.1.1.3 Landscape -community Combinations of Highest Ecological Priority

To determine which natural communities are most important to a vertebrate Species of Greatest Conservation Need in each Ecological Landscape, an additional summary statistic was used. This summary statistic, ecological priority, is based upon the association a given species has with each natural community and each Ecological Landscape, and the opportunity for protection, restoration, and/or management for each natural community in each Ecological Landscape (see Section 2.4 for a detailed review of the methodology used to determine natural community associations, natural community opportunities, and ecological priorities). The results of this process are presented as ecological priorities for each species because they represent the greatest conservation opportunities based upon natural community and Ecological Landscape considerations.

The highest scoring ecological priorities for each species are displayed in the table "Landscape-community Combinations of Highest Ecological Priority" in each species summary. At least 10 of the highest scoring landscape-community combinations are listed for each species. More than 10 landscape-community combinations are listed when there were "ties" between numerous landscape-community combinations.

The ecological priority score allows for the rapid determination of which natural communities in which Ecological Landscapes of Wisconsin represent our greatest opportunities to conserve the most important habitat for a Species of Greatest Conservation Need. Ecological priority score is a relative measure that is not meant for comparison between species. This score does not consider socio-economical factors that may dictate protection and/or management priorities differently than those determined solely by ecological analysis. Further, a low ecological priority score does not imply that management or preservation should not occur on a site if there are important reasons for doing so locally.

3.1.1.4 Threats, Issues, and Priority Conservation Actions

The species threats, issues, and priority conservation actions provided in the summaries were identified by the Species Teams described in Section 2.1. Threats, issues, and conservation actions provided in this plan are intended to be illustrative rather than definitive. They were not ranked in any way. All of the species-specific conservation actions identified in this plan are considered to be a priority. Any species-specific conservation action that was not determined to be a priority was not included. It is important to recognize that there are many conflicting conservation actions identified in this plan that will need to be resolved as part of the plan implementation process. When implemented, conservation actions should be integrated to the greatest extent practicable.

Conservation actions are broad approaches or interventions that will be employed to overcome a problem or take advantage of an opportunity so as to bring about a desired outcome. Actions are intentionally broad, directional, and nonspecific to provide flexibility for finding the specific actions that all interests can live with. The conservation actions presented in this plan were designed to address the threats and issues that pose challenges to the conservation of Wisconsin's Species of Greatest Conservation Need and their habitats. As such, they are not meant to be an exhaustive list of actions that would benefit Species of Greatest Conservation Need and their habitats. It is recognized that other threats and issues and, therefore, additional conservation actions likely exist. Further, these actions only consider ecological factors and not sociological, economic, legislative, or other issues that will affect whether a particular conservation action is taken. Implementation of particular actions will be specified, scheduled, staffed, and funded in operational plans of the Department and its partner conservation organizations. Some actions may never be taken, but those identified would help secure our state's populations of Species of Greatest Conservation Need.